Specification of Thermoelectric Module

TETC1-127018

Description

The 127 couples, 40 mm × 40 mm size single module is made of selected high performance ingot and fabricated by our unique "soft" processes to achieve superior cooling/heating performance. The module is able to run million thermal cycles in 70 °C temperature change range with less 3% degrading. It is good for the need of frequently cooling down and heating up to 100 °C applications. If higher operation or processing temperature is required, please specify, we can design and manufacture the custom made module according to your special requirements.

Features

- No moving parts, no noise, and solid-state
- Compact structure, small in size, light in weight
- Environmental friendly
- RoHS compliant
- Precise temperature control
- Exceptionally reliable in quality, high performance

Application

- Food and beverage service refrigerator
- Portable cooler box for cars
- Liquid cooling
- Temperature stabilizer
- CPU cooler and scientific instrument
- Photonic and medical systems

Performance Specification Sheet

Th(°C)	27	50	Hot side temperature at environment: dry air, N ₂	
DT _{max} (°C)	74	83	Temperature Difference between cold and hot side of the module when cooling capacity is zero at cold side	
U _{max} (Voltage)	16.8	18.2	Voltage applied to the module at DT _{max}	
I _{max(} amps)	3.03	3.03	DC current through the modules at DT _{max}	
Q _{Cmax} (Watts)	31.7	34.1	Cooling capacity at cold side of the module under DT=0 °C	
AC resistance(ohms)	4.2	4.5	The module resistance is tested under AC	
Tolerance (%)	± 10		For thermal and electricity parameters	

Geometric Characteristics Dimensions in millimeters

Positive lead wire 20 AWG leads PVC Negative lead wire 300±3 Cold side:Tc See ordering option See ordering option

Manufacturing Options

A. Solder:

B. Sealant:

1. T100: BiSn (Tmelt=138°C)

1. NS: No sealing (Standard)

2. T200: CuAgSn (Tmelt = 217°C)

2. SS: Silicone sealant

3. T240: SbSn (Tmelt = 240° C)

3. EPS: Epoxy sealant

C. Ceramics:

D. Ceramics Surface Options:

1. Alumina (Al₂O₃, white 96%)

1. Blank ceramics (not metalized)

2. Aluminum Nitride (AlN)

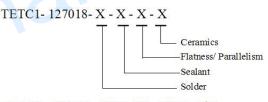
2. Metalized

Ordering Option

Suffix	Thickness	Flatness/	Lead wire length(mm)	
	(mm)	Parallelism (mm)	Standard/Optional length	
TF	$0:4.8\pm0.1$	0:0.08/0.08	300±3/Specify	
TF	1:4.8±0.03	1:0.03/0.03	300±3/Specify	

Eg. TF01: Thickness 4.8±0.1(mm) and Flatness 0.03/0.03(mm)

Naming for the Module



TETC1- 127018- T100 -SS - TF01- AlO

T100: Solder, BiSn (Melting Point=138 °C)

SS: Silicone sealing AlO: Alumina white 96%

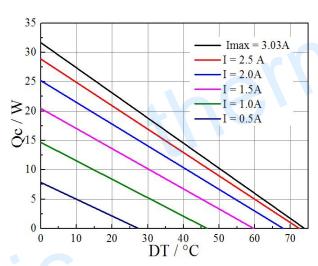
TF01: Thickness ±0.1(mm) and Flatness/Parallelism 0.025/0.025(mm)

Operation Cautions

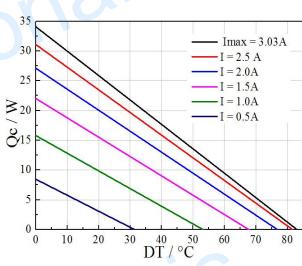
- Attach the cold side of module to the object to be cooled
- Attach the hot side of module to a heat radiator for heat dissipating
- Operation below I_{max} or V_{max}
- Work under DC

Performance Curve

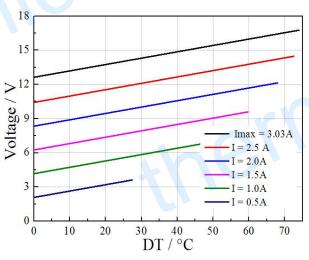
Performance Curves at Th=27 °C

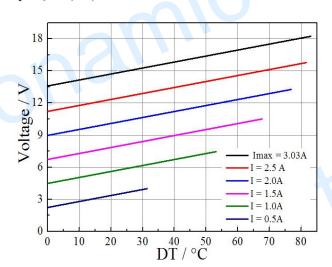


Performance Curves at Th=50 °C

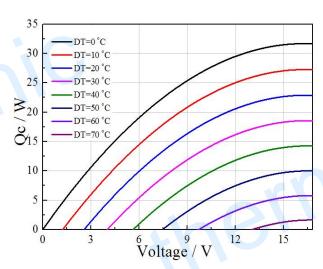


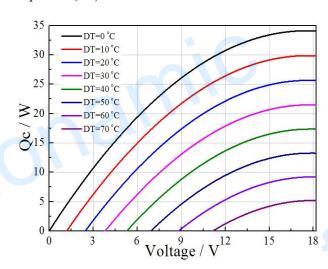
Standard Performance Graph Qc= f(DT)



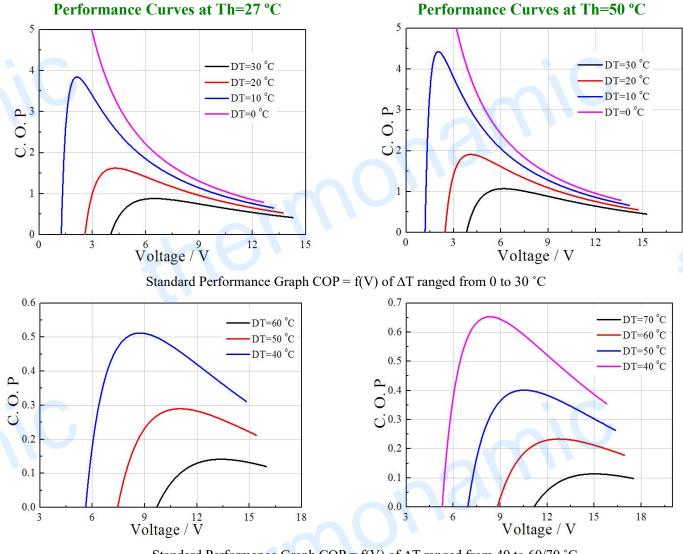


Standard Performance Graph $V = f(\Delta T)$





Standard Performance Graph Qc = f(V)

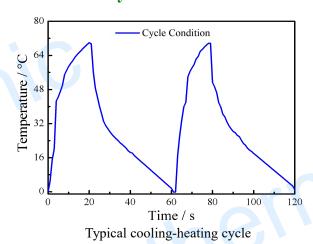


Standard Performance Graph COP = f(V) of ΔT ranged from 40 to 60/70 °C

Remark: The coefficient of performance (COP) is the cooling power Qc/Input power (V \times I).

A typical 127 couples module is fabricated by the unique "soft" process and has demonstrated that it only has 2.5% degrading after 300,000 thermal cycling. The below graphic shows that in beginning 120,000 cycles, it degrade about 2.5%, and then go on stable with very tiny degrading in further 180,000 thermal cycles. It is derived out that the modules can go over million thermal cycles.

TEC Thermal Cycle Lifetime Test On TETC1-12706



TEC Module cycled at Tc = 0 C and Th = 70 C

TEC reference Module without cycled

AC Resistance change

1.5

0.0

8

16

24

32

Cycle Number / 10⁴

The Chart for AC Resistance and AC Resistance Changes

vs Cycle Number